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vol 1

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Regulæ Trium Ordinum
LITERARUM TYPOGRAPHICARUM:
OR THE
RULES
OF THE
THREE ORDERS
OF
Print Letters:
viz. The { ROMAN / *ITALICK* / ENGLISH } CAPITALS and Small.

Shewing how they are compounded of *GEOMETRICK FIGURES*, and mostly made by *Rule* and *Compass*.

Useful for Writing Masters, Painters, Carvers, Masons, and others that are Lovers of Curiosity.

By Joseph Moxon, *Hydrographer to the Kings most Excellent Majesty.*

LONDON:
Printed for *Joseph Moxon*, on Ludgate Hill at the Sign of *Atlas*. 1676.

XS-676-M87R
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RULES

OF THE

THREE ORDERS

OF

6118.36
Vol 1

2d.
Exchange
B. H.

To the Worſhipful

Sir Chriſtopher Wren, *Knight*,

Surveyor of His Majeſty's Buildings.

SIR,

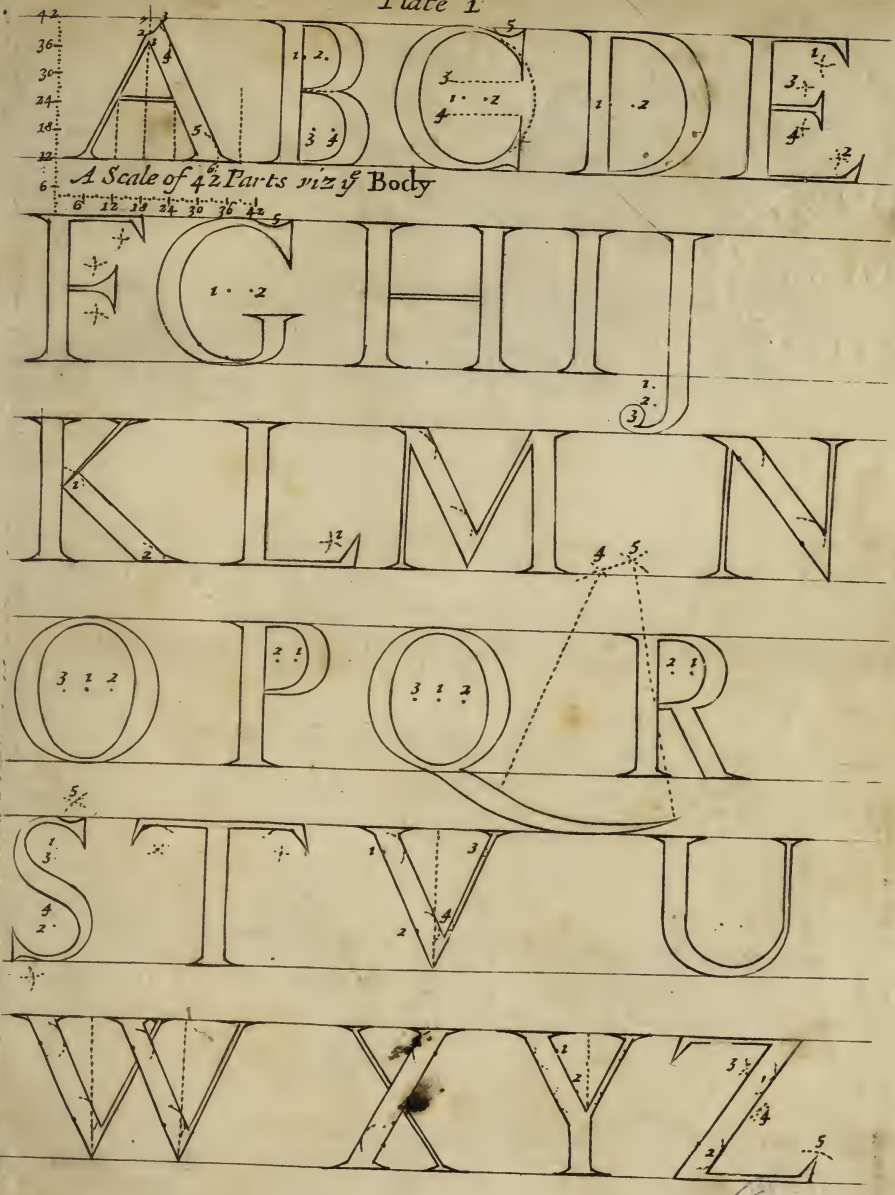
TO *You as to a Lover of* Rule and Proportion *I humbly Dedicate theſe my Obſervations upon Letters: If they prove Acceptable to you I have my whole Wiſh, and ſhall be careleſs of the Sleightings or Cenſures of the Ignorant Contemners of* Order and Symmetry.

Sir, I am

Your moſt Humble Servant.

Joſeph Moxon.

Plate 1



A B C D E

F G H I

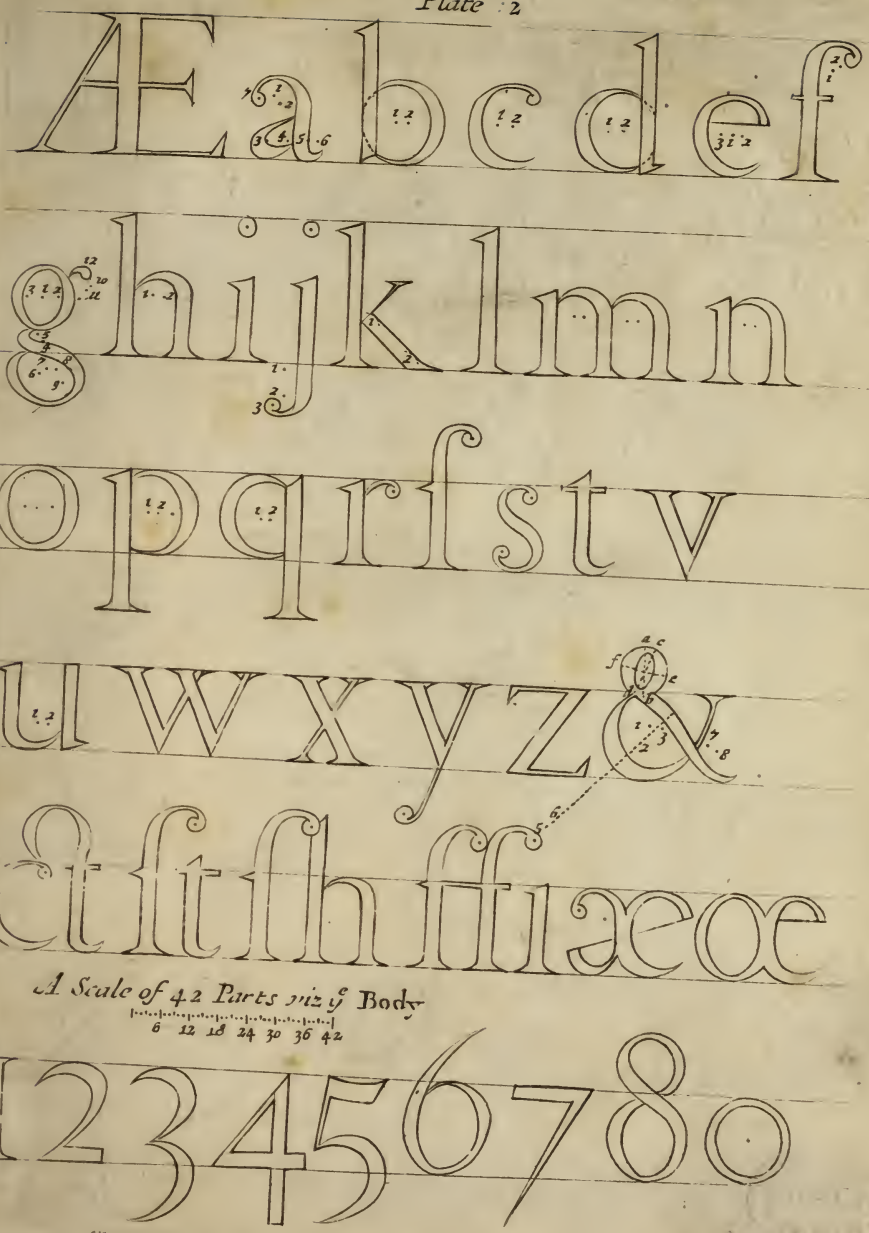
K L M N

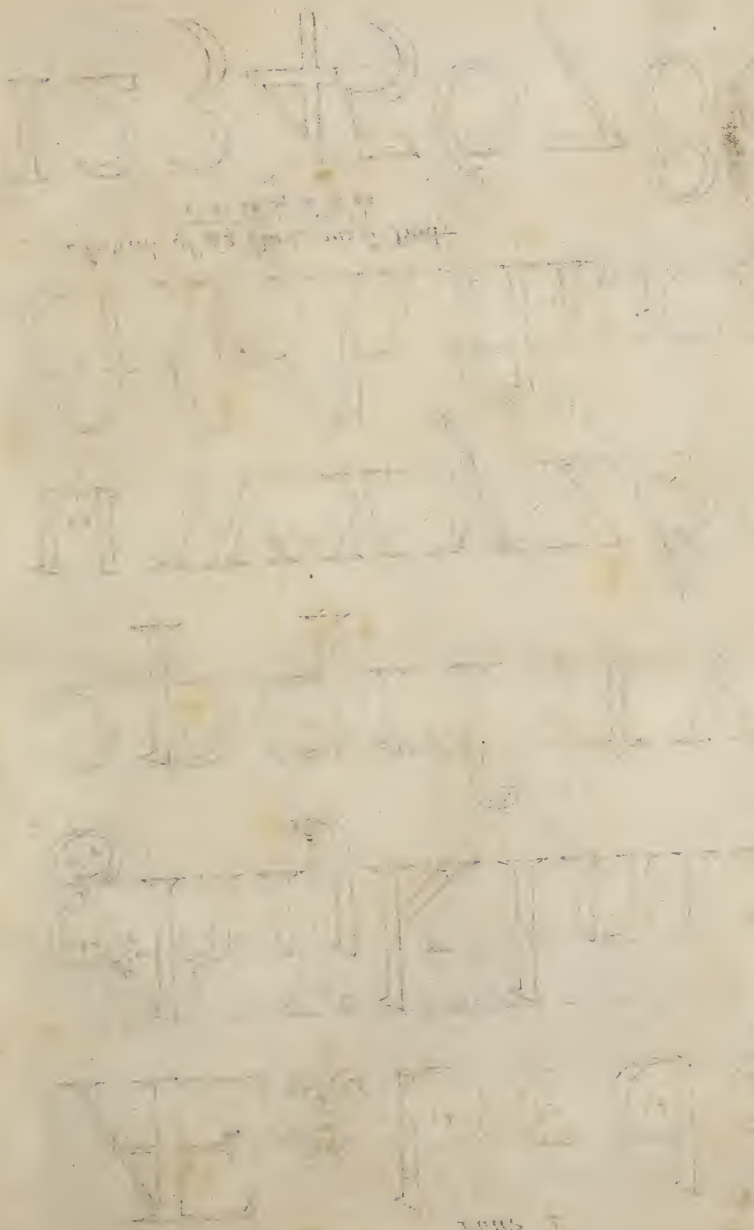
O P Q R

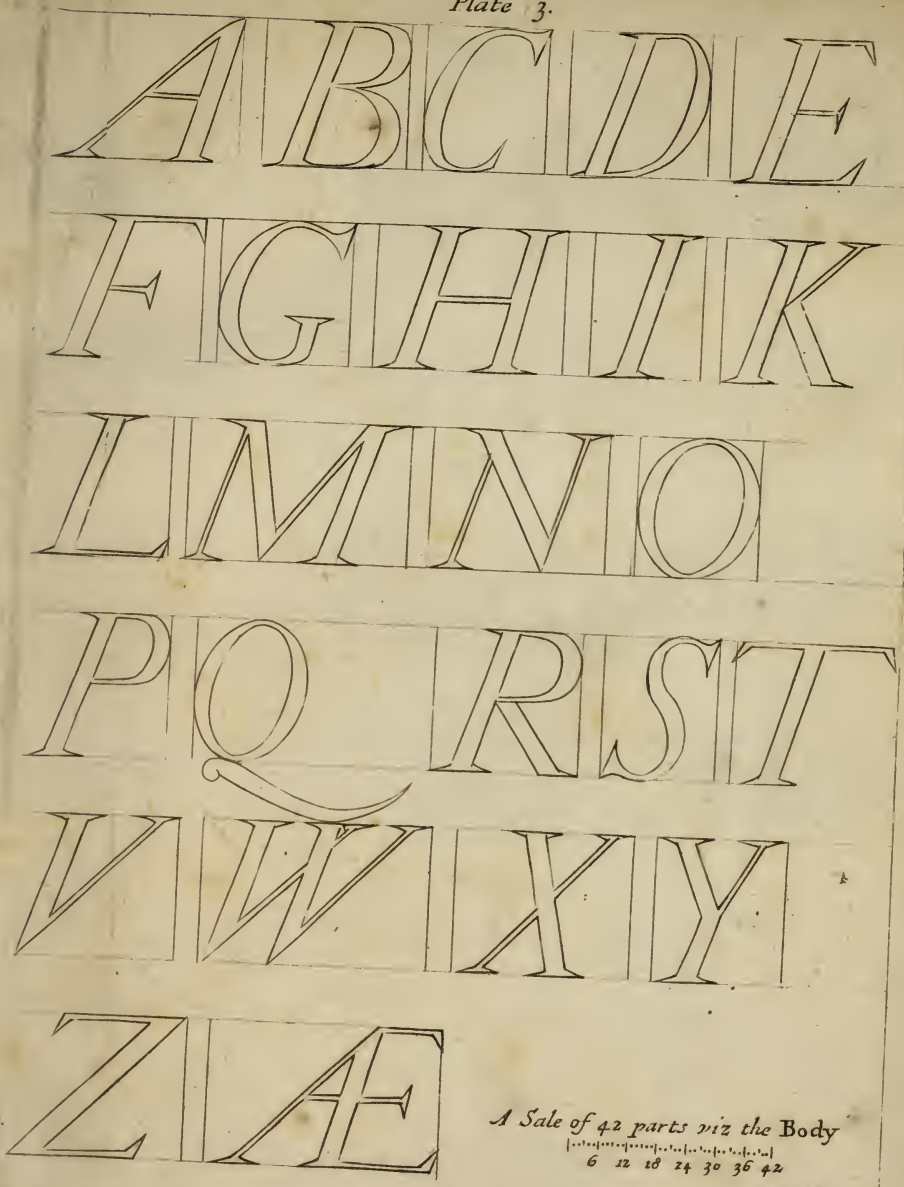
S T V U

W X Y Z

Plate 2



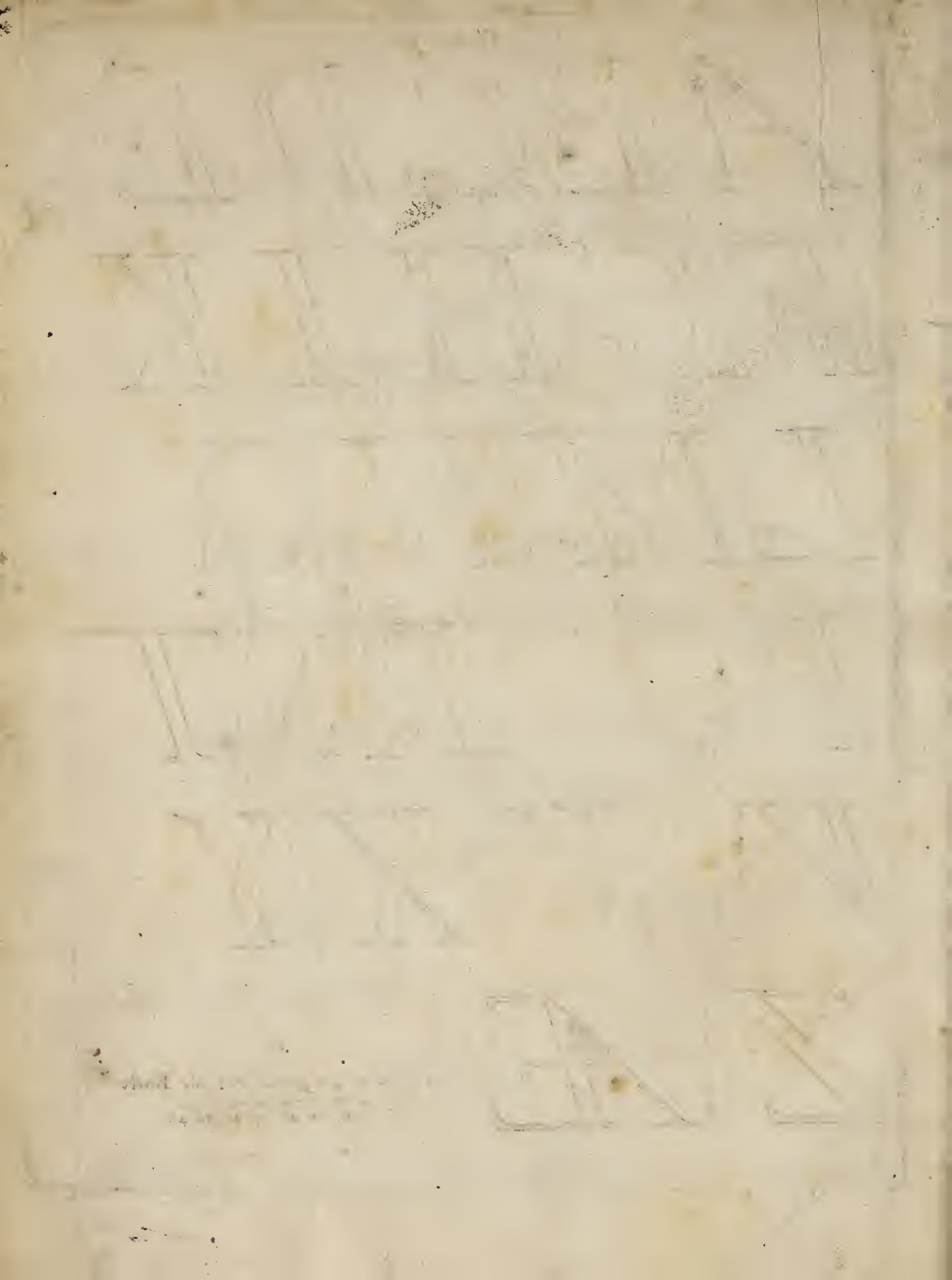




A Sale of 42 parts viz the Body

6 12 18 24 30 36 42

LIBRARY



a b c d e f g h i

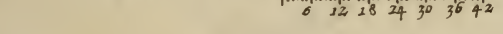
j k l m n o p q

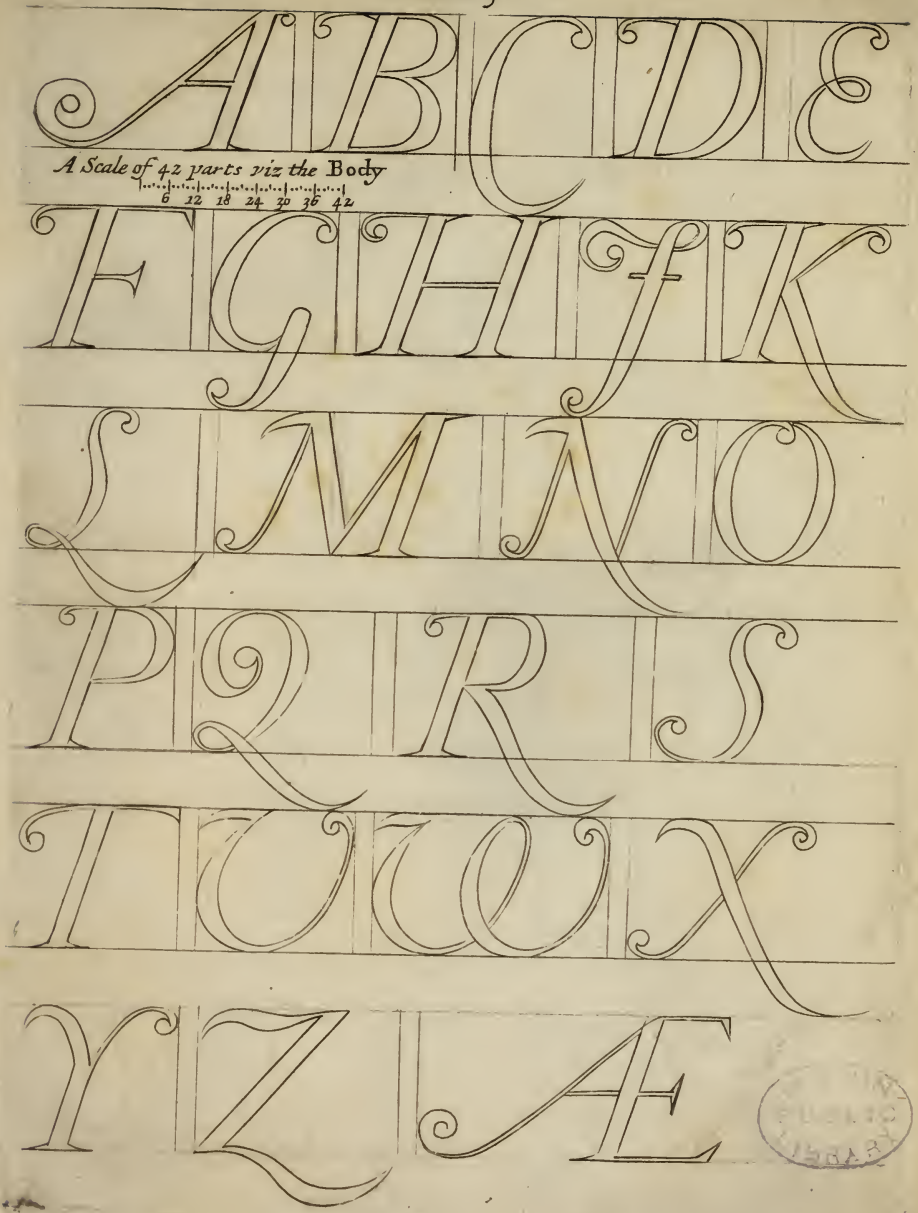
r ſ s t u v w x

y z & ct ſt ſh

æ œ ſi ffi fl ffl

A Scale of 42 Parts viz the Body




A B C D E
A Scale of 42 parts viz the Body
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F G H I K
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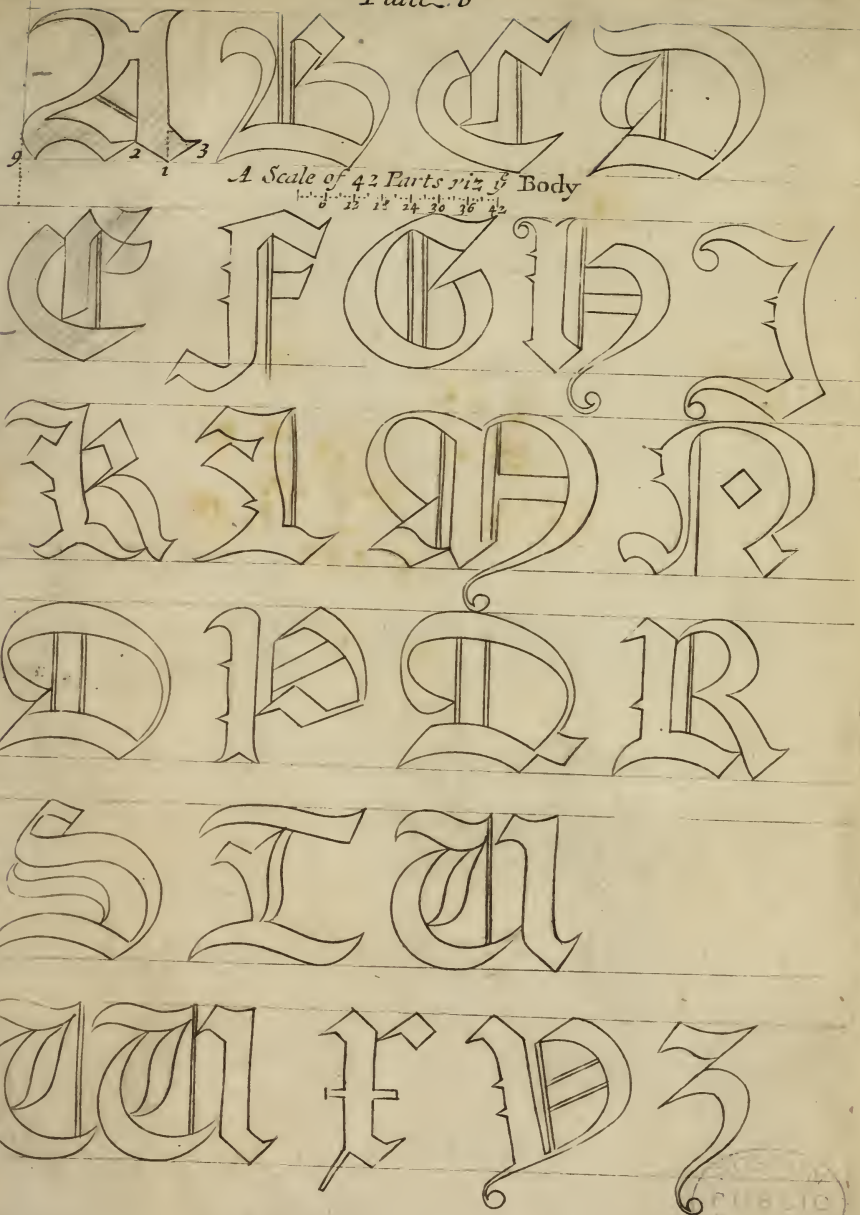

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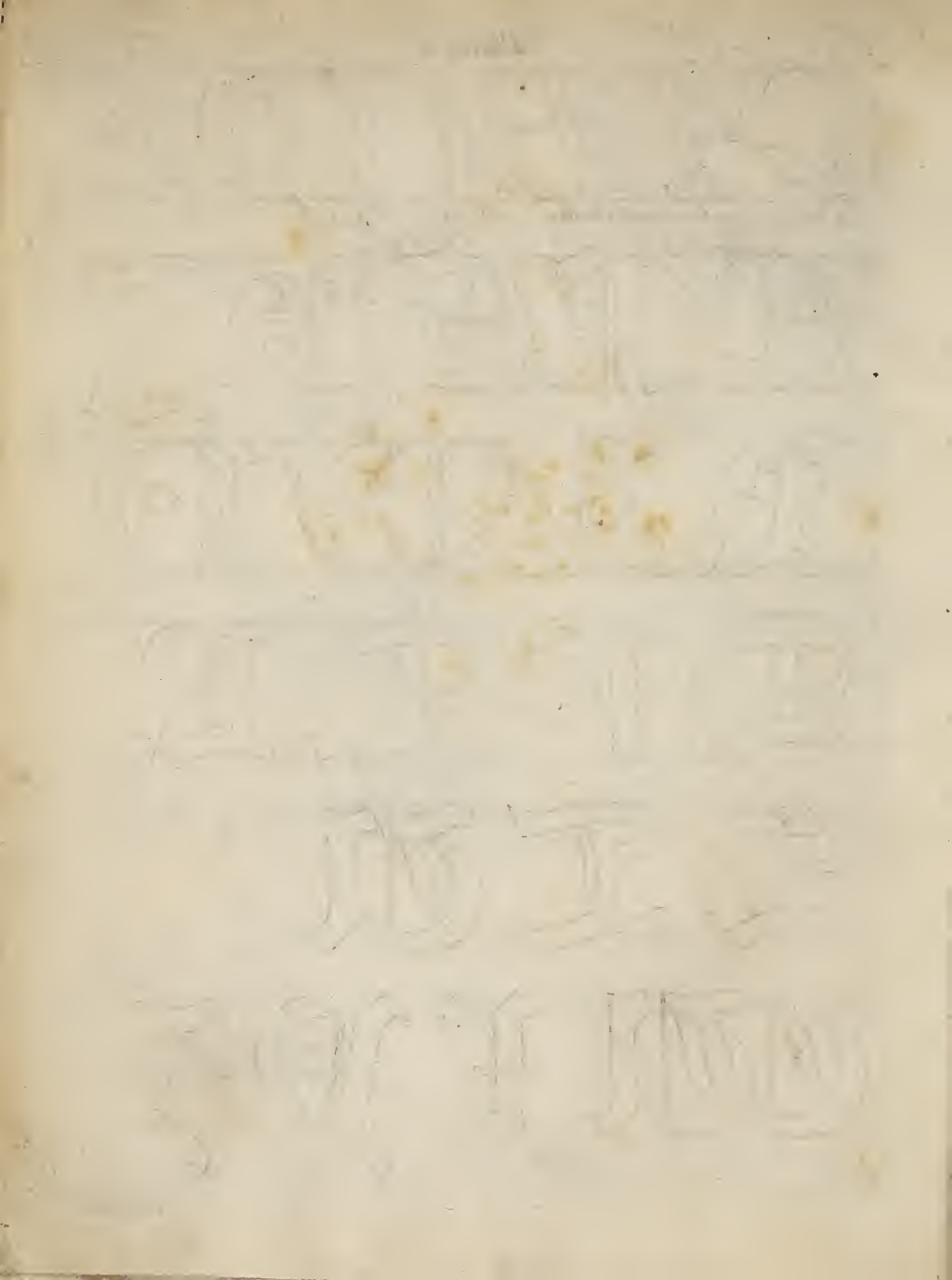

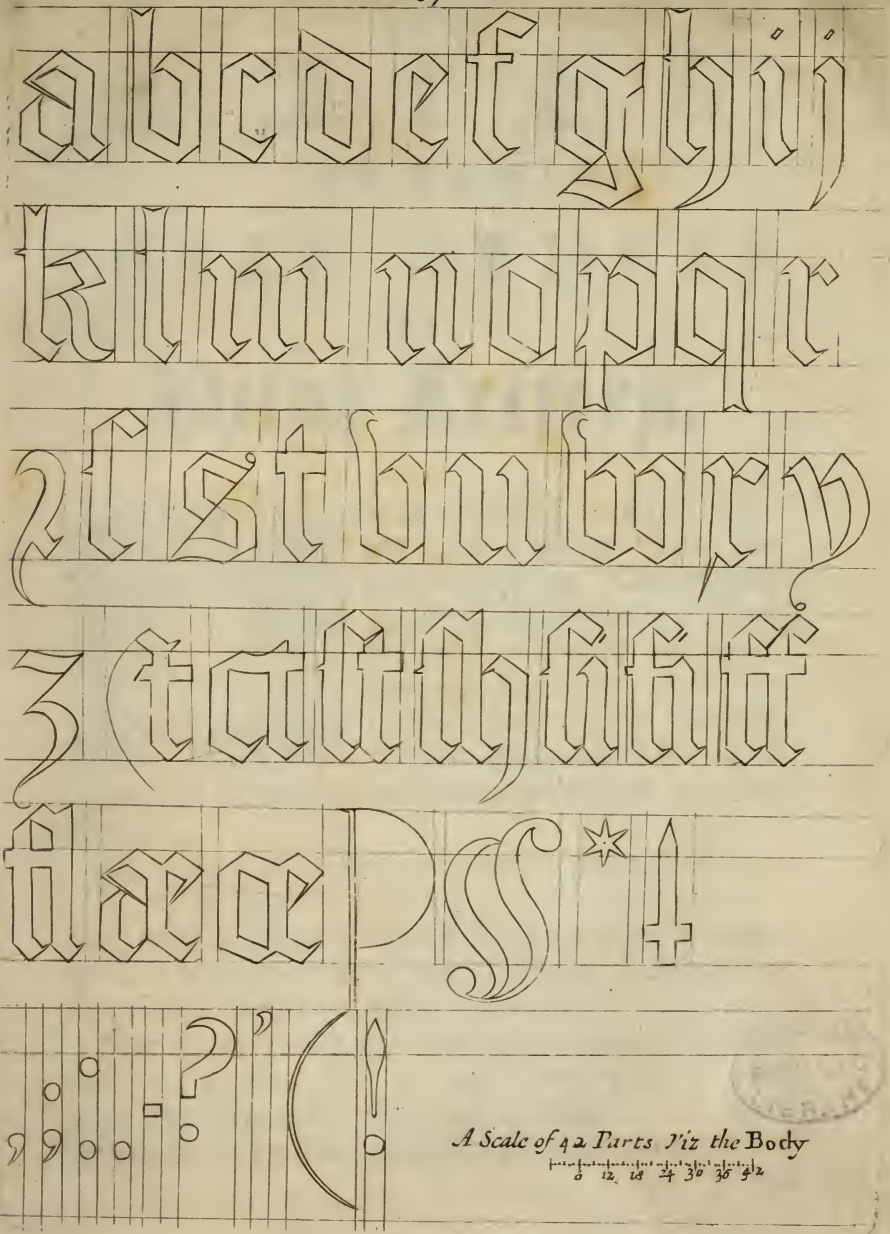
abcdefghij
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A Scale of 42 Parts Viz the Body
0 12 18 24 30 36 42

THE RULES OF THE THREE ORDERS OF Print Letters.

AMong the many curious Inventions of Humane Wit, the communicating Conceptions by the Complication of Characters is worthily accounted the moſt Ingenious, moſt Neceſſary, and moſt Admirable, that an High-flown Fancy in its greateſt Sublimity could have produced into the World.

But who thoſe lucky perſons were that firſt invented it, themſelves and all other Authentick Authors have left Succeſſion in ignorance of; and conſequently their Memories have loſt thoſe due Celebrations that their Merits have juſtly deſerved.

Nor are we onely ignorant of the Perſons that firſt invented Letters, but of the Time wherein they were firſt invented. And though ſmaller matters of great Antiquity ſtand recorded for the Information of

Po-

Posterity, yet no other certainty have we of the Time, than that they were invented before any History was writ.

All the light we have of its Original is among Fabulous Authors, who attribute it to several persons, and some of them no less than Gods; but their Authority being denied, their Say-so stands for no Proof.

I might amplifie this Discourse by saying somewhat of the *Hieroglyphicks* of the *Egyptians*, and the several Characters of other Nations; but they are largely handled by others, and are alien to my purpose: for my Intentions are onely to insist upon three sorts of Characters, which are commonly used in Print among us, *viz.* the *Roman*, the *Italick*, and the *English* Letters.

Nor are the Originals of these three sorts of Letters certainly known, but that we received the *Roman* Letters from the *Romans*, the *Italick* from the *Italians*, and the *English* is that Character which is handed down to us from our Forefathers in their Records and other Manuscripts.

How much Printing has improved the Regularity and Beauty of these Letters is visible by comparing Printed with Written Letters; but especially the curious Printing of *Holland*, which does indeed of all others merit the greatest Applause, it being from the cutting of the Steel Punches to the pulling off at the Press managed with greater rCuiosity than hitherto any Nation hath performed it. Neither is it strange it should be so: For, if I may be pardoned for the Excursion, I will say, There is one general Cause why they must, and several particular Reasons why they may, out-do all other Nations in this and other Handicrafts

dicrafts which will yield them a Profit. The general Cauſe is the Neceſſity of their Countrey, which forces them to deal by Whole-ſale in all Manufactures. And this Cauſe draws in the particular Reaſon; for by this means Manufactures are ſo improv'd, that moſt rare Artiſts flock thither as to a Market, where they are likely to find Trading. And it muſt neceſſarily follow, that where ſo many Curious Artiſts meet, each, for his Profit, or Credit, or both, ſtrives to out-do the other. And by this means Art muſt needs be more improved there, than in thoſe Countries where the Emulation of a Competitor is no Spur to Perfection.

I finding therefore that the *Holland* Letters in general are in moſt eſteem, and particularly thoſe that have been cut by the Hand of that Curious Artiſt *Chriſtofel van Dijck*, and ſome very few others, have elected them for a Patern in *Romans* and *Italicks*, and have given you thoſe Proportions and Dimenſions they obſerved. Even as *Vitruvius* did by his Columns; for he finding, that among the many ſorts of Columns that were ſtanding in his time, Five onely were moſt acceptable, *viz.* the *Tuſcan*, *Dorick*, *Ionick*, *Corinthian*, and *Compoſite*, ſurveyed their exact Dimenſions, and called that Survey, *The Rules of the Five Orders of Arthitecture:* which Rules are followed to this day; but had elſe doubtleſs ere now been loſt or at leaſt corrupted.

The *Roman* Capitals have already been treated of by *Albert Durer*; but he medled neither with the Small Letters nor *Italicks*. Nor were theſe Proportions in mode in his time; for he makes his Stem one tenth of the length, when-as now the Stem is made much fatter, for it is one ſixth part of the length,

which

which does not onely adde a great Grace to the Letter, but renders it more easie to the Eyes in Reading, and more durable either for Inscriptions or Records.

It is possible my Pains and Endeavours may lie under the Censure of Detracting *Momes*, who neither know, or are capable to learn the Excellency of Rule and Proportion; and account those Fantasticks that either prescribe or follow them: For, say they, what needs all this ado about Letters, when every Painter or Mason can make them well enough without these Directions? And if they are not so exact Print Hand, yet they may very well be read, and are as significant as if they were made by these Rules.

In answer I may say, that every Carpenter can build a great Fabrick; but if he have not consulted the Rules of Architecture, it is very likely his Building may be preposterous, his several Offices unapt, and his whole Structure deficient, ungraceful, and ridiculous. But since we all strive to make Columns and other Ornaments in Architecture by Rules, because they should be strong, beautiful, and graceful to the Eye, 'tis surely necessary that the Inscriptions (which are commonly placed in the Architrave or some other eminent place) should be likewise regular and beautiful, lest they disgrace both Builder and Building too.

When the Stadthouse at *Amsterdam* was finishing, such was the Curiosity of the Lords that were the Overseers of the Building, that they offered *C. van Dijck* aforesaid 80 Pounds Sterling (as himself told me) onely for drawing in Paper the Names of the several Offices that were to be painted over the Doors, for the Painter to paint by. Now had these Rules been

been publiſhed in that time, every Painter might indeed have done them as well as *van Dijck* himſelf. For where many Figures are made by the ſame Rules, every one ſhall be like every one, although they are made by ſeveral Hands. So that I hope no Artiſts will grudge either at the Rules or Price of the Book, ſince by it they may eaſily arrive to the ſame Perfection of Letters, as he did who was worthily accounted the beſt.

But this I will ſay too, that though theſe Letters were doubtleſs firſt invented and contrived to be made with Rule and Compaſs, (and now doubtleſs ſomewhat debaucht from their original Invention) yet after an Artificer hath implanted theſe general Rules in his Memory, and uſed his Hand to the making of theſe Letters, he may be able to perform this Work very well without running over all theſe Preſcriptions. Beſides, the very Draughts of the Letters will ſhew him what parts of a Letter muſt be fat or lean, ſtreight or circular.

Now before I begin with the particular Rules of each Letter, I think it fit to explain the Meaning of ſome Terms that will be convenient to be uſed in this Practice; and alſo to give you an account of the Method to be obſerved in the Making of Letters. As,

1. Among Letters ſome are *Capitals*, ſome are *Small*. The *Capitals* are the Great Letters, therefore called *Capitals*: as A, B, C, &c. are *Capitals*.

2. *Small* are thoſe Letters that in long Diſcourſes follow the *Capitals*: as a, b, c, d, &c. are *Small Letters*.

3. Among the *Small Letters* ſome are *Long*, and ſome are *Short*.

4. The *Long* are the *Aſcendents* and *Deſcendents*.

5. The *Short* are thoſe that ſtand between the *Head* and *Foot-line*, ſuch are a, c, e, m, &c.

6. All the *Capitals* are *Aſcendents*, ſo called becauſe they ſtand higher than the *Head-line* of the *Short*. And among the *Small* Letters ſome are *Aſcendents*, as b, d, h, i, k, l; theſe reach up to the *Top-line*.

7. *Deſcendents* are thoſe that ſtand lower than the *Foot-line*: ſuch as are g, p, q, y; theſe reach down to the *Bottom-line*.

8. *Long* are thoſe that ſtand as high as the *Aſcendents*, and as low as the *Deſcendents*; *viz.* reach up to the *Top* and down to the *Bottom-line*: ſuch as are *J*, *Q*, *f*, *j*, *ſ*.

9. The *Length* is the Diſtance between the *Top* and *Bottom-lines*: as the Diſtance 0,42 in Letter A is the *Length*.

10. The *Head-line* is the upper line that bounds the *Short* Letter: as Parallel 30 in *Romans* and *Italicks*, and Parallel 33 in the *Engliſh*, is the *Head-line*.

11. The *Foot-line* is the lower line that bounds the Letter: as Parallel 12 in the *Romans* and *Italicks*; and Parallel 9 in the *Engliſh*, is the *Foot-line*.

12. The *Top-line* is the line that bounds the top of the *Aſcending* Letters: as Parallel 42 is the *Top-line*.

13. The *Bottom-line* is the line that bounds the bottom of the *Deſcending* Letters: as Parallel 0 is the *Bottom-line*.

14. The *Stem* is the ſtraight fat ſtroke of the Letter: as in B the upright ſtroke on the left hand is the *Stem*, and Capital I is all *Stem*, except the *Baſe* and *Topping*.

15. *Fat*

15. *Fat ſtrokes.* The *Stem* or Broad ſtroke in a Letter is called the *Fat ſtroke*, as the Right Hand ſtroke in Letter A, and the great Arches in Letter B, are *Fat ſtrokes.*

16. *Lean ſtrokes* are the narrow ſtrokes in a Letter, as the Left Hand ſtroke in Letter A, and the Right Hand ſtroke in V, are *Lean.*

17. The *Footing* is the ſmall Arches the Letter ſtands on, as the Arches upon the feet of Letter A is the *Footing* of that Letter.

18. The *Topping* is the ſmall Arch above the Letter, as the Arches in the Tops of the Letter V are the *Toppings* of that Letter.

19. The Diviſions that are imagined to be made between the Top and Bottom-line are called *Parallels*, and numbered upwards with 1, 2, 3, to 42 in Letter A at the Left Hand, and ſo of all other Letters.

20. The Diviſions that are imagined to be made between the Left Hand and the Right are called *Erects*, and numbered from the Left Hand to the Right with 1,2,3,4,&c.

21. Theſe Diviſions are all along throughout this Book called *Parts:* as when I ſay, Set off 1,2,3,&c. Parts, I mean ſet off ſo many of theſe Diviſions or Parts, either in the imagined Parallel or Erect.

22. The Diſtance between one word and another is called a *Space.*

23. A *Space* is 7 parts of the whole Length of the Letter: as the whole Length is 42, ſo a *Space* is 7 of 42, which is the ſixth part of the Length.

Some Rules to be followed in the Making of Letters.

1. The Length is divided into 42 Equal *parts*; from the *Bottom* to the *Foot* is 12 of them in *Romans* and *Italicks*, and in *Engliſh* 9, as aforeſaid.

2. From the *Bottom* to the *Head-line*, as in Letter a, is 30 of them, and in Letter a 33. From the *Bottom* to the *Top* is all the 42. So that a *Short* Letter of *Romans* and *Italicks* ſtands between Parallel 12 and Parallel 30, and in *Engliſh* between Parallel 9 and 33.

3. The *Stem* and other *Fat* ſtrokes of *Capitals Roman* is 5 *parts*.

4. The *Stem* and other *Fat* ſtrokes of *Capitals Italick* is 4 *parts*.

5. The *Stem* and other *Fat* ſtrokes of *Small Roman* is $3\frac{1}{2}$ *parts*.

6. The *Stem* and other *Fat* ſtrokes of *Small Italick* is 3 *parts*.

7. Of *Engliſh* the *Short* ſtand between 9 *parts* at the *Bottom*, and 9 *parts* from the *Top*, as aforeſaid.

8. The *Stem* of *Engliſh Capitals* is 6 *parts*.

9. The *Stem* of *Engliſh Small Letters* is 4 *parts*.

10. If theſe Letters are made with a Pen, this general Rule is to be obſerved, That in making them you begin where the Letter may be quickeſt made. As for Example, If you would make M, you muſt begin at the *bottom* on the Left Hand; for then without moving the Pen off the Paper you make the whole Letter at once, all but the *Footings* and *Toppings*, and then you will find the courſe and progreſs of

of the Pen will make those strokes *Lean* which should be *Lean*, and those strokes *Fat* which should be *Fat*. For as the Pen goes upwards, its Nib strikes a *Lean* stroke; but as it comes down its Nib opens wider, and strikes a *Fatter* stroke. So that whatever Tool a Letter is made with, you are to consider it as made with a Pen, and to allow it its *Fat* and *Lean* strokes accordingly. But in this the Copies of the Letters themselves will more fully instruct you.

11. You must take special care that you allow the Letter its full length: for because none of the Capitals but the Consonant J and Q are *Descendents*, you may be apt to think that in some cases, where the Inscription is all Capitals, you may drive up the *top* of the under-line above the *bottom* of the line above it; yet if a Consonant J or Q should come in the matter, you must be forced to shorten it, and so lose its grace. But besides, the whole Inscription will not shew so fair and beautiful, as if this convenient Space be allowed it. And if any *Ascending* Letters should happen under the J or Q, there would be no room for their Heads.

12. When I direct you to set off 1, 2, or 3 *parts*, &c. you are to understand it for 1, 2, or 3 *parts* of the Erect line or the Parallel line.

Some Considerations to be had in the ordering of Inscriptions, &c.

If your Inscription be very short, and you have more room to draw it in than you need, you were best make your Letters in *Roman* or *Italick Capitals*, because you may allow to leave two *Spaces* between every

ry Letter in the ſame word. But then you muſt remember to leave four Spaces at leaſt between each word; for elſe there will not be diſtinction enough between Word and Word proportionable to the diſtinction between Letter and Letter. And you may allow 12 *parts* void between Line and Line, beſides the 12 *parts* that are in all Capital Letters (except Q and J) void between the *Foot* and *Bottom-lines*.

But if you have not too much room, you may leave but one *Space* between every Letter in a Word, and two or three *Spaces* between every Word.

If your Inſcription muſt be *Capitals*, and you are pinched for room, you may (but it is not ſo graceful) leave no *Space* between Letter and Letter; and then one or two *Spaces* between a Word will ſerve. This by Printers is called *Getting in*, or *Setting cloſe*. But by no means you muſt put *Spaces* between Small Letters in the ſame Word; but you muſt put one or ſometimes two between each Word.

If your Inſcription be long, you were beſt uſe the *Small Roman* Letters, becauſe they are much thinner, and are indeed more eaſily read, and more familiar than *Capitals*. But you muſt be ſure to uſe a *Capital* Letter in the beginning, and in all Proper Names either of Perſons or Places, and many times of things if they bear *emphaſis*.

Remember alſo, if your Inſcription be *Roman*, and the Names of Perſons or Places fall in, you muſt make the Names *Italick* Letters, beginning them with a *Capital* Letter, and ſometimes as you would dignifie a Perſon or Place make the whole Name in *Capital* Letters.

If your Inſcription be *Italick*, the Proper Names muſt be *Roman*.

If

If your Inscription be *Latine*, the small *Roman* is the proper Letter for it; but the Proper Names must be *Italick*, and sometimes *Italick Capitals*, as aforesaid; unless it be the Name of some Vulgar place or thing, for which there is no *Latine* Name, then that Name or Word is to be in *English* Letters; but the first Letter a *Capital*, or (for the Reason aforesaid) all *English Capitals*.

Be sure to forecast, that in a large Inscription of a continued *series* of Discourse, each Line be exactly of the same length; unless it be where a Break is proper to be made, for then you may end either in the middle or any where else of the Line. Or unless your Inscription be in Verse, for then also you may end at any length. Yet take notice, that it is not graceful to end a Break with a short word onely in a line, because it seems too like a White-line. But to remedy that inconvenience you may allow more *Spaces* between the words in the former two or three Lines, that so you may have a Word or two the more in your Break-line.

When you begin new matter after a Break, you must indent your Line four *Spaces* at least, and make the first Letter a *Capital*.

When you draw a Title over an Inscription, you must consider the words of *emphasis*, and make those words to vary from the Letter your Discourse is in, as either *Roman*, *Italick*, or *English*, according as the words may properly require. But of this and several other Observations of this nature I have written more at large in a Book I intend to publish of the whole Art of Printing. Yet for your present Instructions I shall give you some Examples of Monuments, &c.

There-

Therefore it will be very neceſſary you deſign and draw your Inſcription firſt on Paper, and then either pounce or draw it through by Redding or Blacking the Backſide of your Paper, and drawing pretty hard upon the Out-ſtrokes of your Letter with the point of a Needle, made blunt, ſmooth, and round, for then the Red or Black on the backſide of the Paper will deliver it ſelf upon the Wood or Stone that it is to be engraven or painted on. But if the Stone be ſo ſmooth and hard that it will not receive and take off the Red or Black, you may rub your Stone over with a little Bees Wax gently, and it will take off the Tracings very exactly.

JOANNES SELDENUS
Heic juxta ſitus. Natus eſt 16 Decemb. MDLXXXIV.
Salvintoniæ,
Qui viculus eſt Terring Occidentalis in
Suſſexiæ Maritimis,
Parentibus honeſtis,
JOANNE SELDENO THOMÆ Filio è quinis
ſecundo,
Anno MDXLI. nato;
&
MARGARETA Filia & Hærede unica THOMÆ
BAKERI de Ruſhington, ex Equeſtri
BAKERORUM in Cantio Familia,
Filius è cunis ſuperſtitum unicus,
Ætatis ferè LXX. Annorum.
Denatus eſt ultimo die Novemb. Anno Salutis
reparatæ MDCLIV.
Per quam expectat
RESURRECTIONEM Felicem.

ROW-

ROWLANDUS JEWKES

Executorum Teſtamenti

MAGNI SELDENI

è quatuor unus,

Spe certâ Reſurrectionis futuræ per CHRISTUM ad gloriam,

Exuvias Carnis ſuæ prope Cineres ejuſdem

SELDENI

Heic juxta reponi, vivens, curavit, exceſſit,

Anno { Æræ Chriſtianæ MDCLXV.
Ætatis ſuæ LXXVII.

Cùm Chriſtus, qui eſt vita noſtra, apparebit, nos etiam apparebimus cum eo in gloria.

IF these following Precepts do not exactly agree with all present Practice, yet will I not determine whether Practice ought or no to give way and comply with these Precepts and Paterns; since 'tis plain that these Letters were originally contrived under these or some such Rules. And though some of these Letters may with greater study be reduced to shorter Rules, yet because my leisure will not permit me to do it, I'le leave it to those that have more Time and better Invention, and deliver these according to my Observations on them.

A

DIvide the whole Erect Depth o 42 into 42 equal parts, and set off the same Divisions in the bottom-line; then in the Parallel of 12, *viz.* the Foot-line, set off 16 from the left hand towards the right, and from thence erect a Perpendicular unto the Top-line. From either side this Perpendicular set off 10 in the Foot-line: then in this Perpendicular at Parallel 38 make a Prick, (as at Fig. 1.) then by the side of a Ruler laid to this Prick, and the two Tens set off in the Foot-line on either side the Perpendicular draw two straight lines for the insides of A, but continue the right hand straight line to Parallel 39, (as at Fig. 2.) Then set your Compasses to 1, and set off that distance from the left hand the Perpendicular in Parallel 39, and set off the same distance in the Foot-line from the left hand inside stroke of A towards the left hand, and draw a straight line through these two points to be the outer bounds of the bredth of the left hand stroke of A. The bredth of the right hand stroke

is

is 5 parts. Therefore in the Point where the two inside strokes of A meet, (as at Fig. 1.) place one foot of your Compasses (being set to 5) and with the other describe the occult Arch 3,4. Then place one foot of your Compasses at the right hand stroke of the inside of A in the Foot-line, and with the other describe the occult Arch 5,6. Then lay your Ruler to the outer Convex points of these two occult Arches, and by the side of it draw a straight line from the Top-line to the Foot-line, for the outward bounds of the right hand stroke of A. Set off 1 in the Top-line from the outer bounds of this right hand stroke towards the left, (as at 3) and draw a straight line in the Top-line to that point; set your Compasses to 3, and placing one foot in this point, with the other describe an occult Arch towards the left hand; then place one foot of your Compasses in the Point where the inside of the right hand stroke meets with the outside of the left hand stroke of A, and with the other foot describe another occult Arch towards the right hand, to cut the former occult Arch, and the Point where they cut each other shall be the Centre, (as at Fig. 7.) whereon you may describe the hollow Arch in the head of A. Draw two straight lines in Parallel $24\frac{1}{7}$ and $24\frac{1}{7}$ between the two insides of A. Lastly, from both sides each side of A set off 5 in the foot-line or Parallel of 12, then set your Compasses to 15, and in the Erects of those Fives place one foot of your Compasses, and with the other describe four Arches to the out and insides of A for the footing.

Here you may see the Fat stroke is 5 parts broad, and the Lean strokes are 1 part broad, and each footing is 5 parts in the Foot-line from its respective side.

The same rule and order is to be observed in all the *Roman* Capitals.

a

Draw a Parallel at 12 for the Foot, and at 30 for the Head. Erect o is the bounds of the Head and belly of a. Set your Compasses to two Stems, *viz.* 7 parts 5 and placing one foot of them in Parallel $23\frac{1}{2}$, and Erect 6 (as at Fig.1.) describe with the other foot the Arch for the outmost bounds of the Head of a. Then set your Compasses to one Stem, *viz.* $3\frac{1}{2}$, and placing one foot in Parallel 26, and Erect $5\frac{1}{2}$, (as at Fig.2.) describe with the other foot the inner Arch of the head of a. Remove one foot of your Compasses to Parallel $15\frac{1}{2}$, erect $3\frac{1}{2}$ (as at Fig.3.) and with the other describe the Arch for the outer belly of a. Remove one foot of your Compasses in the same Parallel to Erect 7, (as at Fig. 4.) and with the other foot describe the Arch for the inner belly of a. Remove one foot of your Compasses in the same Parallel to Erect 12, (as at Fig.5.) and with the other describe a Semicircle for the outer bounds of the tail of a. Joyn this Semicircle by a straight Erect line to the Arch which makes the inside the head of a. Then set your Compasses to half the Stem, *viz.* $1\frac{3}{4}$, and placing one foot in the same Parallel, *viz.* $15\frac{1}{2}$, Erect $13\frac{3}{4}$, (as at Fig.6.) with the other foot describe the Arch for the inside the Tail of a. Joyn this Semicircle by a straight Erect line to the Arch, which makes the outside the Head of a, your Compasses being set as before to $1\frac{3}{4}$, place one foot in Parallel $25\frac{1}{2}$, Erect $1\frac{3}{4}$, (as at Fig.7.) Describe the Arch for the Dot in the Head of a. Make a Prick in Parallel 20, and in the Erect of the inside of the Stem, and from that,

that Prick draw a ſtraight line to the Convexity of the outer belly of a. Work in the inner belly to this ſtraight line; joyn the lower part of the belly by a ſtraight line drawn to the inſide the Stem in Parallel 15½: ſo is a finiſhed. Here you may perceive, that the ſeveral Arches whereof this Letter is made, have their *Radius*, Stems, and parts of a Stem: As the *Radius* of the firſt Arch is 2 Stems, the *Radius* of the ſecond, third, fourth, fifth Arches are 1 Stem, the *Radius* of the ſixth and ſeventh, is half a Stem.

B

Divide the whole Depth into 42, as afore in A. The Topping and Footing is 5 Erects, and the Stem 5 more. Set your Compaſſes to 7, and placing one Foot in Parallel 34½ on the right hand ſide of the Stem, (as at Fig. 1.) deſcribe with the other the inner Arch of the upper belly of B. Remove one Foot of your Compaſſes to Erect 15 in the ſame Parallel, (as at Fig. 2.) and with the other deſcribe an Arch for the outer bounds of the upper belly of B: Set your Compaſſes to 7½, and placing one Foot in Parallel 20, Erect 12, (as at Fig. 3.) deſcribe with the other Foot the Arch for the inner bounds of the lower belly of B. Remove one Foot of your Compaſſes in the ſame Parallel to Erect 17, (as at Fig. 4.) and with the other deſcribe the outer Arch of the lower belly of B. Set your Compaſſes to 15, and placing one Foot in Parallel 27, erect 0, with the other deſcribe the Arches for Topping and Footing. Joyn the Arches of the Bellies Arches to the Stem at the Top, Middle, and Foot, by hand, (as you ſee in the Projection) by ſtrokes

of

of half a part broad, but ſo as the lower belly have nothing of the ſtroke fall in it, becauſe it muſt be half a part bigger than the upper belly.

b

The Beak projects 1 Stem on the left hand, *viz.* $3\frac{1}{2}$ parts, as do all other Projecting Letters in the Small *Roman*. Therefore in Parallel 40 erect 0, make a Prick for the Angle of Projecture. Then in Parallel $38\frac{1}{2}$ erect $3\frac{1}{2}$; make another Prick for the left hand bounds of the Stem; between which 2 Pricks draw a ſtraight line. Make another Prick in Parallel 42. Erect 7 for the right hand bounds of the Stem, and draw another ſtraight line between the firſt Prick and this laſt; ſo is the Beak made. Then in Parallel 12 Erect 0, ſet off $3\frac{1}{2}$ and 7, and from Erect $3\frac{1}{2}$ at the under ſide of Projecture draw a ſtraight line to $3\frac{1}{2}$ ſet off in Parallel 12, and another ſtraight line from Erect 7 at the upper ſide of Projecture to Erect 7 in Parallel 14; ſo is the Stem made. Then ſet your Compaſſes to 9, and placing one Foot in Parallel 21, Erect $12\frac{1}{2}$, (as at Fig.1.) Deſcribe with the other Foot the outer Arch of the Belly. Then ſet your Compaſſes to 8, and placing one Foot in Parallel 21, erect 10, (as at Fig.2.) with the other Foot deſcribe the inner Arch of the Belly. Set then your Compaſſes to 4, and placing one Foot in Parallel 10 erect 7, (as at Fig.3.) with the other deſcribe a ſmall Arch under the Stem; ſo is b finiſhed.

C

Set your Compaſſes to 15, and placing one Foot in Parallel 27 Erect 15, (as at Fig. 1.) with the other deſcribe a Circle: Cut off half a Stem, *viz.* 2½, of this Circle on the right hand with a Perpendicular line, which Perpendicular muſt reach from the Top-line the breadth of a Stem below the Circle, and from the Foot-line the breadth of a Stem above the Circle, *viz.* 5 parts. Remove your Compaſſes 5 Erects further, *viz.* the breadth of the Stem in the ſame Parallel to Erect 20, (as at Fig. 2.) and deſcribe ſo much of a Circle as will be comprehended between your left hand and the two Perpendiculars, which cut off a part of the former Circle. To deſcribe the great Arches of the Buttings ſet your Compaſſes to 15, and placing one Foot in the Parallels of the extreme inner points of the Buttings at 15 diſtance towards the left hand, (as at Fig. 3, 4.) with the other point deſcribe the Arches of Buttings. Then ſet your Compaſſes to half the breadth of a Stem, *viz.* 2½, and one Foot placed ſucceſſively in the Top and Foot-lines at the Buttings of C, with the other deſcribe the ſmall Arches at the Top and Foot of the out-ſide of C; ſo is C finiſhed. Onely you muſt take care to work in the Interſections of theſe Circles by hand at the Top and Foot; ſo muſt you alſo the ſmall Circles in the Top and Foot.

C

Set your Compaſſes to 9, and placing one Foot in Parallel 21, Erect 9, (as at Fig. 1.) with the other Foot deſcribe a Circle. Cut off a whole Stem, *viz.* $3\frac{1}{2}$ of this Circle on the right hand with a Perpendicular line. Set off $3\frac{1}{2}$ from the left ſide this Circle towards the right in the Parallel of 21. Then ſet your Compaſſes to 8, and placing one Foot in Parallel 22, erect $11\frac{1}{2}$, (as at Fig. 2.) Deſcribe with the other Foot an Arch within the former Circle and the Perpendicular; then ſet your Compaſſes to half the Stem, *viz.* $1\frac{1}{4}$, and placing one Foot where the Perpendicular interſects the Circle in the Head, (as at Fig. 3.) Deſcribe with the other Foot ſo much of a ſmall Circle downwards, as will be between Parallel $26\frac{1}{2}$, and $28\frac{1}{4}$, to make the Dot. And the breakings of theſe Circles you muſt by Hand work into the Head.

D

Topping and Footing is 5 Erects, the Stem five more, both made as ſo much of Letter B. Set your Compaſſes to 15, and placing one Foot on the right hand line of the Stem in Parallel 27, with the other deſcribe a Semicircle towards your right hand. Remove your Compaſſes the breadth of the Stem, *viz.* 5 towards the right hand in the ſame Parallel, and deſcribe another Arch towards the right hand; work theſe Arches by hand up to the Stem, leaving the Lean ſtrokes at the Top and Bottom 1 part; ſo is D finiſhed.

The

d

The Belly of d is made like c, all but the Dot in the head, which d hath not. The Projecture or Beak of the Stem is made like b, but the bottom of the Stem differs; for d hath a Tail which is as long as the Stem is broad, *viz.* $3\frac{1}{2}$, from the right hand line of the Stem of d. This Tail is a ſtraight line proceeding from the bottom of the left hand line of the Stem, whoſe end is raiſed two parts above the Foot-line. The line of the Tail that proceeds from the right hand line of the Stem, is a ſtraight line parallel to the Foot-line.

E

Topping and Footing is 5 Erects, the Stem 5 more; both made as Letter B. The Top-ſtroke is from the right hand line of the Stem half the length of the Stem, *viz.* 15; the middle ſtroke is $\frac{1}{7}$ of the length of the Stem, *viz.* 10. The Bottom-ſtroke is $\frac{1}{11}$, *viz.* 18 parts. The bredth of the Head and Foot-ſtroke is thus made; ſet off the bredth of the Stem, *viz.* 5, from the end of each ſtroke towards the left hand in the Parallel of each ſtroke, and in the Erect line of theſe ſettings off ſet off $1\frac{1}{2}$ between the Topping and Footing, and draw a ſtraight line from the lower point of the Arch of Topping on the left hand the Stem, and from the upper point of the Arch of Topping on the left hand the Stem to the $1\frac{1}{2}$ ſet off as aforeſaid. Then at the right hand ends of theſe

lines ſet off by occult Arches 5 in their reſpective Erects. And ſet off 5 in the Erects of the Perpendicular ends of the Top and Foot-ſtroke, and placing one Foot of your Compaſſes ſucceſſively at theſe 5, with the other Foot deſcribe occult Arches to cut the former occult Arches, and the point where theſe occult Arches cut each other (as in Fig. 1,2.) ſhall be a Centre, whereon you may deſcribe Arches for the Buttings of the Top and Bottom-ſtroke of E. For the thickneſs of the middle ſtroke ſet off half a part upwards, and half a part downwards from the middle Parallel at the right hand line of the Stem, and from thence draw Parallel lines 5 parts long, then ſet off 5 upwards and 5 downwards from the end of the middle ſtroke; from theſe two 5 and the ends of the Parallels of thickneſs deſcribe occult Arches of Circles to interſect each other, and the Interſections (as Fig. 3,4.) ſhall be the Centres whereon (the Compaſſes ſet to 5) the Arches of Butting ſhall be drawn.

e

Set your Compaſſes to 9, and placing one Foot in Parallel 21, Erect 9. Deſcribe with the other the outer Arch; then in the Parallel of 9 ſet off $3\frac{1}{2}$ for the Fat ſtroke. Set your Compaſſes to 8, and place one Foot in this $3\frac{1}{2}$, and pitch the other Foot where it will leight, in the Parallel of $21\frac{1}{2}$ towards the right hand, (as at Fig. 2.) On this point deſcribe the inner Arch of e; then in the Parallel of 23 draw a line for the Eye, from the inſide of e to the outſide on the right hand. But the Fatneſs of the Eye muſt be half a part at the right hand ſide of e; therefore

in

in 23½ from the outward right hand Arch draw a line to the point where the former line touches the inside of e. Then measure the Fatness of the left hand Arch of e in the Parallel of 24, and set off that Fatness from the right hand Arch of e inwards, and setting your Compasses to 8, place one Foot in the measure of Fatness so set off, and pitch the other Foot where it will fall in the Parallel of 21¼ towards the left hand; on this point describe the inner Arch of the right side of e. The Angles of the Intersections of these Arches make you must smoothen by hand.

F

Is made like E, onely instead of the Foot-stroke here is onely a Footing, made as hath been taught in A, B, D.

f

The Stem is 3½, and runs on the left hand straight upwards to Parallel 36, and on the right hand it runs straight upwards to Parallel 40. Set your Compasses to 7, and placing one Foot in Parallel 35, Erect 10, (as at Fig. 1.) With the other Foot describe an Arch, for the Top of f. The Top of f must be half a part thick; therefore set your Compasses to 4½, and placing one Foot in Parallel 37, Erect 11½, (as at Fig. 2.) With the other describe the under Arch of the Head of f; then set your Compasses to 1½, *viz.* the thickness of half a Stem, and placing one Foot in Parallel 38, Erect 14, (as at Fig. 3.) With the other describe

the Arch for the Dot of f. The ſtroke is half a part thick, the upper line of it lies in the Head-line, *viz.* Parallel 30. It projects on the left hand half a Stem, *viz.* $1\frac{1}{4}$, and on the right hand a whole Stem, *viz.* $3\frac{1}{2}$. The Footing is made by ſetting your Compaſſes to 9, and placing one Foot in Parallel 21, Erect 0, and in Parallel 21 Erect $10\frac{1}{2}$. With the other Foot deſcribe the Arches of Footing. The Breakings and Wants in the Arches you muſt work in by hand.

G

Is made like C till you come to the ſhort Stem whoſe right hand line lies in the Erect Butting, and its left hand line is made by ſetting off 5 to the left hand. The Foot of G is wrought in by ſetting your Compaſſes to 18, and placing one Foot in Parallel 15 in the Erect of Butting, with the other deſcribe an occult Arch towards your left hand upwards in G, then remove one point of your Compaſſes in the ſame Parallel towards the right hand, where that Parallel cuts the inner Circle of G, and with the other point deſcribe an occult Arch to cut the former, (as at Fig. 3.) and that point of Interſection ſhall be the Centre whereon you may deſcribe an Arch to work in the inner Circle of the Foot of G. To work in the outer Circle place one Foot of your Compaſſes again in the Parallel of 15, in the Erect of Butting, and with the other deſcribe an occult Arch as before. Then remove one point of your Compaſſes in the ſame Parallel towards the right hand, where that Parallel cuts the outer Circle of G, and with the other deſcribe an occult Arch to cut the former, (as at 4) and

that

that point of Interſection ſhall be the Centre, whereon you may deſcribe an Arch to work in the outer Circle of the Foot of G. The Topping of the ſhort Stem lies in Parallel 22½, 5 being ſet off from both ſides the Stem, as hath been taught in B, D, &c.

g

Set your Compaſſes to twice the Stem, *viz.* 7 parts, and placing one Foot in Parallel 23, Erect 8, (as at Fig.1.) with the other deſcribe a Circle for the outer bounds of the Head. Remove your Compaſſes in the ſame Parallel to 3½ on the right hand, and 3½ on the left hand this Centre, (as at Fig.2,3.) and deſcribe the Arches for the inner bounds of the Head. Set your Compaſſes to 4, and placing one Foot in Parallel 14½, Erect 6½, (as at Fig.4.) deſcribe the outer Arch between the Head and Belly of g; ſet your Compaſſes to 1½, and placing one Foot in the point where this Arch touches the Head, turn the other Foot into Parallel 16, (as at Fig.5.) and on that point as on a Centre deſcribe the inner Arch between Head and Belly of g. Then from Parallel 14½ Erect 5, and Parallel 13 Erect 14, draw a ſtraight line, and from Parallel 11 Erect 3, and Parallel 10 Erect 14, draw another ſtraight line, which two ſtraight lines ſhall be the Waſte of g. Then ſet your Compaſſes to 7½, and placing one Foot in Parallel 7½, Erect 10½, (as at Fig.6.) Deſcribe the right hand outer Arch of the Belly. Set your Compaſſes to 5½, and placing one Foot in Parallel 6½, Erect 11, (as at Fig.7.) deſcribe the right hand inner Arch of the Belly; ſet your Compaſſes to 7, and in placing one Foot in Pa-

Parallel $7\frac{3}{4}$, Erect $10\frac{1}{2}$, (as at Fig. 6.) describe part of the left hand inner Arch of the Belly of g. Set your Compasses to 8, and placing one Foot in Parallel 8, Erect 8, (as at Fig. 8.) Describe another outer Arch on the left hand side of the Belly; set your Compasses to 6, and placing one Foot in Parallel 5. Erect 6, (as at 9.) With the other describe the outer Arch under the Waste of g on the left hand. Remove your Compasses to Parallel $24\frac{1}{4}$, Erect $18\frac{1}{2}$, (as at Fig. 10.) and describe an Arch for the upper bounds of the Nose of g. Remove your Compasses to Parallel $22\frac{3}{4}$, Erect $16\frac{1}{2}$, (as at Fig. 11.) and describe the under Arch of the Nose. Set your Compasses to half the Stem, *viz.* $1\frac{1}{4}$, and placing one Foot in Parallel $27\frac{1}{2}$, Erect 16, (as at Fig. 12.) Describe the small Arch for a Dot on the Nose. The Intersections and Breakings of the several Arches you must work in by hand, as you may see by the Letter it self.

H

Has two upright Stems with Toppings and Footings, which are made like the Stems of other Capitals. These two Stems must stand the bredth of four Stems asunder, *viz.* 20 parts. They are joyned just in the middle between Head and Foot, with a straight Parallel line half a part broad.

h

The Stem of h is made like the Stem of b, onely it has Footing on both ſides. The Footing hath the bredth of the Stem on either hand, *viz.* 3½ parts, and is made like the Footing of Capitals. The width between the inſide the two Stems is 2½ Stems, *viz.* 8¼ parts. To make the Arches that joyn theſe two Stems together, divide the diſtance between the inner ſtroke of the left hand Stem and the outer ſtroke of the right hand Stem into two equal parts, and ſet off that diſtance in the Erect in the middle between them from the Head-line, *viz.* Parallel 30. downwards; and placing one point of your Compaſſes there, (*viz.* at 1) with the other deſcribe an Arch to reach from the left hand Stem to the right hand Stem. Then divide the diſtance between the two inner ſides of the Stem into two equal parts, and placing one Foot of your Compaſſes in the middle between the two Stems and in the ſame Parallel the former Arch was ſtrook, (as at 2.) with the other Foot deſcribe the under Arch of h. The right hand ſide of the Stem of h and its Footing are made as before.

I

Set off 3 Stems in the Foot-line in Parallel 12, one for the left hand Footing, another for the Stem, another for the right hand Footing. Do the like in the Top-line, and between the Topping and Footing draw the Stem. The

i

The Stem of i is made like the Stem of h, but is not so long, for it stands between Parallel 12 and 30. The Tittle stands right over the Stem, half a Stem lower than the Top-line, and its Diameter is one Stem, *viz* $3\frac{1}{2}$ parts.

J

The Stem and Topping of this J is made like I, but half way between the Foot and Bottom-lines the right hand stroke begins to fall away into an Arch of a Circle, which we call a Tail in Letters, whose Semidiameter is two Stems; therefore your Compasses being set to two Stems, *viz.* 10. place one Foot in Parallel 10 in the Erect of the Topping, which is two Stems from the right hand stroke of J, (as at 1) and with the other Foot describe an Arch for the Bottom of J. Then set your Compasses to one Stem, *viz.* 5, and in Parallel $5\frac{1}{2}$, and the same Erects, (as at 2.) describe another Arch for the inner Arch of the Bottom of J; then set your Compasses to $2\frac{1}{2}$, *viz.* half a Stem, and place one Foot in Parallel 3, Erect $2\frac{1}{2}$, (as at 3) and with the other describe the Dot of J.

j

The Stem and Tittle of this j is made like i. The Semidiameter of the lower Arch of its Tail is two of its

its Stems, *viz.* 7. whose Centre lies two Stems from the Bottom-line, *viz.* in Parallel 7 in the Erect of its Beak, (as at 1.) The Semidiameter of its inner Arch is one Stem, *viz.* $3\frac{1}{2}$, and its Centre lies in $3\frac{1}{2}$ in the same Erect, (as at 2.) The Diameter of the Dot is one Stem, and its Centre lies in Parallel $2\frac{1}{4}$, Erect $1\frac{1}{4}$.

K

The Stem of K is made like I. It branches upwards from the middle of the Stem into Parallel 42, *viz.* the Top-line. The outside of the Top of its Branch is distant in the Top-line from the inside of the Top of the Stem 15 Erects, *viz.* 3 Stems, and the inside the Branch is 14 Erects from the Top of the Stem; so that a straight Ruler laid to these two points successively, and to the middle length of the Stem, describes this upper Branch. The lower Branch is as broad as the Stem, *viz.* 5 parts, and hath its inner Footing one Stem, *viz.* 5 parts, distant from the Footing of the Stem. Therefore set your Compasses to 5, and placing one Foot in the middle of the inside the Stem, with the other Foot describe an occult Arch, (as at 1.) Then remove your Compasses to the point in the Foot-line where the inside of the lower Branch cuts it, and describe another occult Arch, (as at 2.) Then lay a straight Ruler to the Convex points of these two Arches from the upper Branch to the Foot-line; then set off on either side these two Branches 5 for the Topping and Footing, and in the Erects of these several settings off describe the Topping and Footing.

k

The Stem of k is made like the Stem of h; its upper Branch proceeds from the right hand line of the Stem in Parallel 21, which is equally between the Head and Foot-line. The outside the Head of the Branch is distant in the Head-line $8\frac{1}{4}$ from the Stem, *viz.* two Stems and an half; and the inside of the Head of the Branch is distant 8 from the Stem in the Head-line 5 so that a straight Ruler laid successively to these two distances, and to the point in the Stem from whence this Branch proceeds, gives the upper Branch. The inside the lower Branch is distant from the Stem $8\frac{1}{4}$ in the Foot-line, and the outside the lower Branch is distant $12\frac{1}{4}$ from the Stem in the Foot-line. Therefore draw a straight line from the point where the upper Branch joyns to the Stem $8\frac{1}{4}$ in the Foot-line, and that shall be the inside lower Branch. Draw another straight line Parallel to this straight line at $3\frac{1}{2}$ distance, (as the occult Arches (1,2.) shew, and that shall be the outer bounds of the lower Branch. The Heading and Footings are made as K aforesaid, onely instead of 5 Erects from the in and outside the Branches you must now make but $3\frac{1}{2}$.

L

Is made like the Stem and Foot-stroke of E.

l

Is made like the Stem of h.

M

The left hand ſtroke is 1 broad, and the right hand ſtroke is a Stem, *viz.* 5. The inſides of theſe Shanks ſtand 25 aſunder, *viz.* 5 Stems. The reſt is V all but the inſide Toppings, which are left out. And you muſt note, that the left hand line of the outer bounds ſtands at the Top in the Erect of the left hand line of the left hand Shank. Topping and Footing hath been taught before.

m

The firſt Stem is made like i. The ſecond and third Stem and their Arches are made like the ſecond Stem and Arch of h.

N

The two upright ſtrokes are each 1 broad, and their inſides are 20 aſunder. The Diagonal is made by ſetting off from the outer ſtroke on the left hand towards the left hand 1 in the Top-line, from whence a ſtraight line drawn to the outer bounds of the right hand ſtroke in the Foot-line gives the lower

bounds of the Diagonal. The upper bounds are made by ſetting your Compaſſes to 5, and placing one Foot ſucceſſively in the lower line, (as at Fig. 1.) with the other Foot deſcribe occult Arches, to the Convex points of which a ſtraight Ruler laid, and a line drawn by the ſide of it, ſhall be the upper bounds of the Diagonal. The Toppings are made as before.

n

Is the two firſt Stems of m.

O

The outer bounds of O is an exact Circle. The Fatning is made by ſetting off 5 on either ſide the Centre in the ſame Parallel, for theſe ſettings off ſhall be the Centres, on which you muſt deſcribe Arches for the inner bounds of O; onely you muſt work in the Interſections of the Arches by hand.

o

Is an exact Circle, and hath its Fatnings as O, onely the Fatnings muſt be but $3\frac{1}{2}$, becauſe it is a ſmall Letter.

P

The Stem is made like I, all but the right hand Topping is left out. Its Head is made by ſetting your Compaſſes to $7\frac{1}{2}$, *viz.* one Stem and an half, and placing one Foot in Parallel $34\frac{1}{2}$, which is $1\frac{1}{2}$ Stem from the Top-line; Erect $16\frac{1}{2}$, (as at Fig. 1.) with the other Foot deſcribe an Arch from the Top-line for the outer bounds of the Head. To deſcribe the inner bounds ſet off 5 in the Parallel of $34\frac{1}{2}$ towards the left hand for the Fatning. Then ſet your Compaſſes to 7, and placing one Foot in the part ſet off for the Fatning; pitch the other Foot in the Parallel the former Centre lies in, (as at 2.) and deſcribe the inner Arch. But becauſe theſe Arches reach not home to the Stem, you muſt make up the Top and Underneath with ſtraight lines drawn to the Stem.

p

The Stem of p is made like the Stem of h. But h is an Aſcending Letter, and therefore hath its Stem reaching up to the Top-line; and p is a Deſcending Letter, and hath its Stem reaching down to the Bottom-line. The Belly of p is made upon three Centres. The Arches of the Belly of p are Arches of a Circle; the Centre of the outer Arch lies in Parallel 21, Erect $12\frac{1}{2}$, (as at 1.) The inner Arch is made by the ſetting off a Stem from the outer Arch inwards in the Parallel 21, and bringing this ſetting off

and the two points where the outer Arch joyns to the Stem into an Arch of a Circle, as you were taught. For first the Compasses set to 9, place one Foot in Parallel 21, Erect $12\frac{1}{2}$, (as at 1.) and with the other describe a Circle for the outmost bounds of the Belly of p. Then set your Compasses to 8, and place one Foot in Parallel 21, Erect $10\frac{3}{4}$, (as at 2.) and with the other describe an Arch that shall reach from the Stem at the Head to Erect $12\frac{1}{2}$; then remove your Compasses to Parallel $21\frac{1}{4}$, Erect 9, (as at 3.) and describe an Arch for the remainder of the inner bounds of the Belly of p.

Q

Hath its Body made like O. The Rump of the Tail is made by drawing a straight line from Parallel $12\frac{1}{2}$ Erect 13, to Parallel 4 Erect 27, and another straight line parallel to it, as you were taught in the lower Branch of K, at the bredth of a Stem from the Body of Q to Erect 30. From this straight Rump the Tail arches and diminishes to the end. It is arched and diminished thus: In Parallel 5 Erect 66, make a mark for the end of the Tail; then set your Compasses to 52, and placing one Foot in Parallel 4, Erect 27, describe an occult Arch; then remove your Compasses to Parallel 8, Erect 30, and describe another occult Arch; then remove your Compasses to the point made for the end of the Tail, and describe an occult Arch that shall intersect the two former occult Arches, and those two Intersections (as at Fig. 4,5.) shall be the Centre whereon you may describe Arches to finish the Tail of Q.

q

The Belly of q is a Circle to the Stem. The fatning of the left hand side is made by setting off one Stem in the Parallel, that the Centre of the outer Arch lies in, (as at 2 5) then describe an Arch to comprehend the part of Fatning set off, and the two points where the outer Arch joyns to the Stem, as was taught. The rest of the Stem and Footing is made like several other Letters before.

R

The Stem, Head, and Footing of R is made like P. The inner side of the Branch proceeding from the Head stands at the Head $2\frac{1}{2}$ distant from the Stem, where make a Prick; and at the Foot 9 distant from the Stem, where make another Prick. Between these two Pricks draw a straight line, and draw another straight line Parallel to it the bredth of a Stem, as you were taught in the lower Branch of K.

r

The Stem of r is made like the Stem of i. To make the small Branch proceeding from the Stem set your Compasses to half the Stem, *viz.* $1\frac{1}{4}$, and placing one Foot in Parallel $28\frac{1}{4}$, Erect 14, describe the small Circle for the Dot of the Branch. Then divide the Parallel distance between the Centre of the Dot and the

the left hand ſtroke of the Stem into two equal parts, and placing one point of your Compaſſes in the Head-line, direct the other point on the Erect of the Diviſion made before, between the Centre of the Dot and the left hand ſtroke of the Stem, (as at 1.) and on that Centre deſcribe the upper Arch to joyn the Dot and Stem together. To deſcribe the under Arch divide the diſtance between the Dot and right hand ſide of the Stem into two equal parts, and ſet that off from the Stem in the Parallel of the former Centre, (as at 2.) and deſcribe the under Arch of the Branch. Footing is made as before.

S

Here are four Circles made to draw S, and the Centres of them all lie in the ſame Erect. To deſcribe the firſt Circle ſet your Compaſſes to $8\frac{1}{2}$, and placing one Foot in Parallel $33\frac{1}{2}$, Erect $8\frac{1}{2}$, (as at 1.) with the other Foot deſcribe a Circle. Set your Compaſſes to $5\frac{1}{4}$, and placing one Foot in Parallel $35\frac{1}{4}$, (as at 2.) with the other Foot deſcribe a ſecond Circle. Set your Compaſſes to 9, and placing one Foot in Parallel 21, Erect $8\frac{1}{2}$, (as at 3.) with the other Foot deſcribe a third Circle. Set your Compaſſes to $6\frac{1}{4}$, and placing one Foot in Parallel $18\frac{3}{4}$, (as at 4.) with the other Foot deſcribe a fourth Circle. I need not teach you how theſe Circles are wrought into an S, becauſe the Letter it ſelf ſhews you plainly. But the Buttings at Top and Foot are thus made: Set off at the Interſection of the firſt Circle with the Erect of the third Circle 5 downwards, and from thence draw a ſtraight line into the Top-line; from this ſtraight

ſtraight line ſet off in the Top-line 5 towards the left hand, and by two occult Arches made on theſe two points in the Top-line you will find a Centre, (as at Fig.5.) whereon (your Compaſſes ſet to 5) you may deſcribe the Arch for the Hollow of the Head of S. For the Butting and Hollow at the Foot draw a ſtraight line through the left hand verge of the firſt Circle into the Foot-line, and in Parallel 21, (which is the Parallel wherein the Centre of the third Circle lies) make therein a Prick for the upper end of the Butting, from thence draw a ſtraight line in the ſame Erect into the Foot-line for the whole Butting; from this point of Butting in the Foot-line (your Compaſſes ſet to 5) meaſure into the third Circle, and on theſe two points deſcribe two occult Arches, whoſe Interſections ſhall be a Centre, (as at Fig.6.) whereon you may deſcribe the Hollow at the Foot of S. How the Tail of S falls off from a Circle towards the Butting you may perceive by the Letter it ſelf, and accordingly work it in by hand.

S

Draw an Erect line, and on it ſet off half a part at the Head, and half a part at the Foot, for the thickneſs of the Head and Foot of s. Then ſet your Compaſſes to 3, and meaſuring in the ſame Erect from the point ſet off at the Head, you have the Centre of the inner Circle of the Head of s; from the bottom of this inner Circle ſet off $3\frac{1}{4}$, *viz.* one Stem in the Erect. Then ſet your Compaſſes to $3\frac{1}{4}$, and meaſure in the ſame Erect from the point ſet off for the thickneſs of s, at the Foot you have the Cen-

tre of the inner Circle of the Foot. Set your Compasses to half the distance between the Top of this Circle and the Head of s, and that half distance shall be the Centre whereon you may describe the outer Circle of the Head. Set your Compasses to half the distance between the bottom of the inner Circle and the Foot-line, and that half distance shall be the Centre whereon you may describe the outer Circle of the Foot. For the Dots at Head and Foot set off one Stem, *viz.* $3\frac{1}{2}$, from the Head and Foot-line, that is, in the Parallels of $14\frac{1}{2}$ and $26\frac{1}{2}$; and where that setting off the inner Circles of Head and Foot, shall be the Centre whereon the Compasses set to $1\frac{1}{4}$, you may describe Circles for the Dots.

f

Is made like f, onely instead of a stroke quite through the Head-line, here is onely a Beak proceeding from the left hand to the Stem in the Head-line. This Beak or Projecture is made like the Projecture of other Letters; onely the line of the Beak that runs into the Head-line is drawn on the left Head-line of the Stem.

T

The Stem and right hand Top-stroke of T is made like the Stem and Top-stroke of E, and the left hand Top-stroke of T is the same with the right-hand Top-stroke, onely the Buttings must be made on the left hand.

t Hath

t

Hath the Top of the right hand ſtroke of its Stem reach $3\frac{1}{2}$, *viz.* one Stem above the Head-line. The ſtroke through the Head is half a Stem broad, and Projects on either ſide the Stem 1 Stem. From the left hand end of the ſtroke draw a ſtraight line to the Top of the right hand ſtroke of the Stem. Both ſides the Stem run ſtraight down to Parallel 15. The Arches of the Tail are thus drawn: Set your Compaſſes to $5\frac{1}{2}$, and placing one Foot in $17\frac{1}{2}$ Erect $8\frac{1}{2}$, (as at Fig. 1.) Deſcribe an Arch to reach from the left hand ſide of the Stem through the Foot-line into the Parallel of 15, where the Tail ſhall end; then ſet your Compaſſes to one Stem, *viz.* $3\frac{1}{2}$, and deſcribe occult Arches from the Tail, and the lower end of the right hand line of the Stem, and where theſe two occult Arches interſect each other, (as here at Fig. 2.) ſhall be the Centre whereon you muſt deſcribe the inner Arch of the Tail.

V

In Erect $17\frac{1}{2}$ Erect a Perpendicular from the Foot-line into the Top-line. Set off from this Perpendicular in the Top-line $12\frac{1}{2}$ towards the left hand, and $12\frac{1}{2}$ towards the right hand; from theſe two points draw ſtraight to the Perpendicular in the Foot-line for the outer bounds of V. Set your Compaſſes to 5, *viz.* one Stem; deſcribe an occult Arch upon ſome convenient point of the left hand line near the

Top, (as at Fig. 1.) Then remove your Compasses to some convenient point near the Foot-line, (as at Fig. 2.) and describe another occult Arch. From the outer verge of these two occult Arches draw a straight line for the inner right hand stroke of V; then set your Compasses to 1, and on the right hand stroke describe two other occult Arches, and draw a straight line by their verges for the inner line of the right side stroke of V. The Toppings are made like the Footings of A, and several other Letters.

V

In Erect $10\frac{1}{2}$ Erect a Perpendicular into the Head-line, and from it set off 7 towards the left hand in the Head-line, and 7 towards the right hand; from these two points draw straight lines into the Foot-line. For the outer bounds set off from the left hand line one Stem, *viz.* $3\frac{1}{2}$ towards the right hand in the Head-line, and describe two occult Arches upon some convenient points of the left hand line, (as at Fig. 1, 2.) From the verges of these two occult Arches draw a straight line for the inner line of the left side; then set off $\frac{2}{3}$ from the right hand line in the Head-line towards the left hand, and describe other occult Arches upon some convenient points of the right hand line, (as at Fig. 3, 4.) and from the outer verges of these occult Arches draw the inner line of the right side of v. The Heading is made like the Heading of k.

U

U is $26\frac{1}{2}$ wide in the Top between the outer bounds. The left hand side is 5 broad, and runs straight down to Parallel $25\frac{1}{2}$. The right hand side is $1\frac{1}{2}$ broad at the Top, and 1 at the Parallel of $25\frac{1}{2}$. Set your Compasses to $13\frac{1}{4}$, and placing one Foot in Parallel $25\frac{1}{2}$, Erect $23\frac{1}{2}$. Describe the outer Arch: Set your Compasses to $10\frac{1}{4}$, and placing one Foot in Parallel $25\frac{1}{2}$, Erect $23\frac{1}{2}$, describe the inner Arch. The Topping make as you have been taught before.

u

The first Stem is made like i, but it rounds at the Foot as h, m, n, do at the Head. The second Stem is sometimes made straight without a Beak, as it is here; sometimes with one made like the former. Its Tail is made like the Tail of d.

W

Is V V, onely the left side of the second V lies over the right side of the first in the Top-line.

W

The same with W, onely you must observe the Dimensions of y.

X

Set off 5 in the Top-line, and 20 in the Foot-line, and draw a ſtraight line between theſe two points. Draw another line towards the right hand Parallel to it by occult Arches the bredth of a Stem. Then ſet off 25 in the Top-line, and 6 in the Foot-line, and draw a ſtraight line between theſe two points, draw another line parallel to it towards the right hand, by occult Arches the bredth of 1. The Toppings and Footings are made as before.

X

Set off $3\frac{1}{2}$ in the Hend-line, and 14, *viz.* four Stems, in the Foot-line, and draw a ſtraight line between theſe two points; draw another line parallel to it towards your right hand, by occult Arches the bredth of a Stem, *viz.* $3\frac{1}{2}$; then ſet off $16\frac{1}{2}$ in the Head-line, and $3\frac{1}{2}$ in the Foot-line, and draw a ſtraight line between theſe two points; draw another line Parallel to it towards the right hand, by occult Arches the bredth of half. The Toppings and Footings are made as before.

Y

Erect a Perpendicular from the Foot-line into the Top-line, and ſet off in the Top-line on either ſide 8. Then in Parallel 27 make a Prick in the Perpendicular

cular from these two settings off in the Top-line draw straight lines to the Prick in the Perpendicular for the inner bounds of Y. Set your Compasses to 5, and on the ends of the left hand line describe two occult Arches, through whose Convex points draw a straight line from the Perpendicular into the Top-line for the outer bounds of the left hand side. Then set your Compasses to 1, and on the ends of the right hand line describe two other occult Arches, through whose Convex points draw another straight line into the Top-line, for the outer bounds of the right side. Then set off in the Foot-line and Top-line 1 on the right hand the Perpendicular, and 4 on the left hand the Perpendicular, and by a Ruler laid to the settings off on either side the Perpendicular draw straight lines from the Body of Y into the Foot-line. The Footing and Topping is made as before.

y

Erect a Perpendicular from the Foot-line into the Head-line, and set off on the left hand $3\frac{1}{2}$, and on the right hand 7 in the Head-line, from the setting off on the left hand describe an occult Arch of 1 Stem, draw a straight line from the Foot-line at the Perpendicular through the Convex point into the Head-line, for the bounds of the left side of y; draw another line Parallel to this line, the bredth of 1 Stem for the inner bounds of the left side, from 7 set off on the right hand the Perpendicular in the Head-line set off half, and from thence draw a straight line into the Foot-line at the Perpendicular for the outer bounds of the right side of y. Draw another

straight

ſtraight line Parallel to it ½ part towards the left hand for the inner bounds of y.

The Tail is an Arch which you may thus make: Under the outer left ſide Heading in the ſame Erect on the Bottom-line deſcribe a Circle for the Dot of the Tail, whoſe Diameter ſhall be 1 Stem; then ſet your Compaſſes to 42, (the whole depth of a Letter) and placing one point almoſt at the Bottom of the right ſide the Dot, deſcribe with the other Foot an occult Arch; then place one Foot of your Compaſſes at the lower Angle of the Body of Y, and with the other Foot deſcribe another Arch to cut the former Arch, and where theſe two Arches cut each other ſhall be the Centre whereon an Arch deſcribed from the Dot to the Angle aforeſaid ſhall be the outer bounds of the Tail. The inner bounds are made by deſcribing an Arch Concentrick to the former. The Headings have been taught before.

Z

Set off 20 in the Top-line; from thence draw a ſtraight line into Erect o in the Foot-line; then by occult Arches 1, 2, made towards the right hand, draw a line 1 Stem, *viz.* 5 parts, between the Top and Foot-line for the right hand line of Z. The Top and Foot-line are each 1 part thick. The Butting at the Top is made by ſetting your Compaſſes to 5, and drawing a ſtraight line in Erect o from the Top to this ſetting off; then ſet your Compaſſes to 15, and placing one Foot in this ſetting off, with the other Foot deſcribe towards the right hand an occult Arch, (as at 3.) Then remove your Compaſſes to

Pa-

Parallel 41, Erect 1, and with the other Foot describe another occult Arch to cut the former, and where these two occult Arches cut each other is the Centre, whereon you may describe the hollow of the Buttings. The Buttings of the Foot-line is made by setting your Compasses to 5, and placing one Foot in Prallel 13 Erect 26; with the other Foot describe an occult Arch, (as at 5.) in that occult Arch in Erect 28½ make a Prick, and laying a straight Ruler to this Prick and the right hand end of the Foot of Z, draw a straight line for the Butting. Then set your Compasses to 15 and 14; at the end of this straight line place one Foot of your Compasses, and with the other describe an occult Arch towards the Stem, (as at 5.) then remove your Compasses, and place one Foot in Parallel 13, 1 part from the end towards the left hand line of Butting, and with the other Foot describe another occult Arch to cut the former, and where these two occult Arches cut each other shall be the Centre, whereon you shall describe the hollow of the Butting of the Foot.

Z

Set off in the Head and Foot-lines 17½. Set your Compasses to 3½, *viz.* 1 Stem, and towards your right hand describe in the Foot-line an occult Arch, (as at 1.) Lay your Ruler to 17½; set off in the Head-line and to the Convex point of this Arch, and draw the right hand line of the Stem; then remove your Compasses to 17½ in the Head-line, and towards the left hand describe another occult Arch, (as at 2.) Lay your Ruler to Erect 0 in the Foot-line, and the

Convex point of this Arch, and draw the left hand line of the Stem. The Head and Foot-lines are half thick. The Butting at the Head is half above the Head-line; therefore set off half in the Erect o, and hollow it to the Head-line, as you were taught before by two occult Arches, (as at 3.) The other Buttings are made as the Head Butting of Z; but onely the Butting of the Foot is straight upright in this Letter, and in that it runs up aslope towards the right hand, as you may see by the Letters themselves.

&

Of all the Characters yet made this is the most troublesom, it having no less than 10 Centres in it, and consequently as many Arches. But thus it is made: Set your Compasses to $9\frac{1}{4}$, and placing one Foot in Parallel $21\frac{3}{4}$ Erect $9\frac{1}{4}$, (as at 1.) with the other Foot describe the under part of the arching Belly from Parallel $17\frac{1}{2}$ to Parallel 22; then set your Compasses to $8\frac{1}{2}$, and placing one Foot in Parallel 20 Erect $8\frac{1}{2}$, (as at 2.) with the other Foot describe the upper part of the arching Belly. Then set your Compasses to 8, and placing one Foot in Parallel 22 Erect 12, (as at 3.) with the other Foot describe an Arch for the inside of the Belly. Then set your Compasses to 5, and placing one Foot in Parallel 34 Erect $8\frac{1}{2}$, (as at Fig. 4.) with the other Foot describe almost a Circle for the outside of the Head; through this Circle draw a Perpendicular Diametral line, (as *a*, *b*) and from the point *a* set off in the Circle towards the left hand 2 parts, (as at *c*) and set off 2 parts towards the right hand from *b* to *d* through the

Dia-

Diametral *c*, *d*, draw another Diametral line at right angles, as *e*, *f*. Then in the point where this Diametral line cuts the Circle of the Head, as at the point *e*, ſet off on the Diametral line $3\frac{1}{2}$, *viz.* one Stem, and with your Compaſſes ſet to 5, (as before) place one Foot in the Point ſet off, and extend the other on the Diametral line, and placing it there, with your firſt Foot deſcribe the inner Arch of the Head on the left hand. Then ſet off alſo $3\frac{1}{2}$, *viz.* 1 Stem on the right hand from the Interſection of the Diametral and the Circle, and place one Foot of your Compaſſes (being ſet to 5) there, extending the other on the Diametral towards the left hand, and on that point with the other Foot deſcribe the other inner Arch of the Head, which meeting of the two Arches at the Top and Bottom you muſt work into an Oval. Then ſet your Compaſſes to 32, and placing one Foot in the point where Erect 6 cuts the under part of the outer Circle of the Head, with the other Foot deſcribe towards the Bottom-line on your left hand an occult Arch. And removing one point of your Compaſſes to Erect 17 Parallel 15, with the other Foot deſcribe another occult Arch to interſect the former, (as at 5.) and on this point as on a Centre deſcribe an Arch for the inſide the Diagonal Stem. Then draw a ſtraight line from the middle part of this Diagonal Stem, and ſet off on it from the Centre 5, $3\frac{1}{2}$, *viz.* 1 Stem, and placing one Foot of your Compaſſes as before, (as at Fig. 6.) with the other deſcribe the outer Arch of the Diagonal Stem. The Tail of the Diagonal Stem is made by ſetting your Compaſſes to $6\frac{1}{2}$, and placing one Foot in Parallel $18\frac{1}{2}$, Erect 22, (as at Fig. 7. with the other deſcribe the under Arch of the Tail as far as Parallel 15 Erect 27. The upper

Arch of the Tail is made by ſetting your Compaſſes to 4½, and placing one Foot in Parallel 17 Erect 24, (as at Fig.8.) with the other deſcribe it; onely the end of the Tail muſt be wrought into a ſharp point. The Arch above the Diagonal Stem is made by ſetting your Compaſſes to 24, and placing one Foot in Parallel 33 Erect 1, (as at 9.) with the other deſcribe the outer Arch. Then remove your Compaſſes to Parallel 32 Erect half leſs than 0, (as at Fig. 10.) with the other deſcribe the inner Arch.

æ œ ct ſt ſh

And other double Letters, I need not diſcourſe on, becauſe by theſe Paterns you may ſee how they are joyned together.

Having given you ſuch full Inſtructions upon the Roman Capitals and Small Letters, I think it needleſs to give you Copious Rules upon the Italick or Engliſh Letters, the Paterns being ſo large that every Member in them are diſtinct and intelligent, and the Manual Operations ſo much the ſame in all, that the Scales down the ſide and in the Bottom-line ſerve for an ample Diſcourſe upon every one of them.

Of Italick Letters.

ITalick Letters ſeem to be derived from the Roman, becauſe its ſhape is ſo like the Roman, that its Members differ in very few Letters from it; onely the Stems of the Roman are perpendicularly upright, and the Bellies are circular, but in the Italick the Stems

Stems are aſlope, and the Bellies are oval. The ſlope of the Stems are $\frac{1}{4}$ of the whole depth of the Letter, *viz.* $10\frac{1}{2}$ parts ſet off from a Perpendicular on the left hand in the Top-line, and a line drawn from the ſame Perpendicular in the Foot-line to the $10\frac{1}{2}$ in the Top-line, as in Letter *A*, *B*. From 1 to 2 is the ſlope of the Letter.

Thoſe Letters that have Bellies, as *a*, *b*, *c*, *d*, *e*, *q*, have the inſide of their Bellies Ovals, whoſe greateſt Diameter is 18 parts, *viz.* the whole length of a Small Letter, and its leaſt Diameter 6 parts; which Oval is ſo ſet aſlope, that half a part lies below the Head-line, and $\frac{1}{2}$ parts above the Foot-line; ſo that working above the Oval into the Head-line, and below the Oval into the Foot-line, you may make the Fatneſs of the Head and Foot of the Belly; but how the Belly fattens downwards, you may beſt ſee by the Paterns themſelves.

The Beaks of Letters project 3 parts, *viz.* 1 Stem from the Stem towards the left hand, and lie at the point of the Beak 1 part below the Top-line; ſo that a ſtraight line drawn from the Top of the right hand line of the Stem to the point of the Beak is the upper bounds of the Beak; and 1 ſet off in the left hand line of the Stem under the lower bounds of the Beak is the thickneſs of the Beak, ſo that a ſtraight line drawn from that point to the end of the Beak is the lower bounds of the Beak.

The Noſe of Small Letters project alſo 3 parts, *viz.* one Stem from the Stem of the Letter, and the point of it lies three parts below the Head-line.

The Tails are made juſt like the Beaks, if you imagine the Foot were turned into the Head-line.

Of the Engliſh Letters.

THis ſort of Letters by the Fatneſs of the Stems ſeems to be firſt invented for durable Records: For from theſe Letters ſeems to proceed the ſeveral Court-hands of Law, Chancery, &c.

Although the moſt parts of theſe Letters, but eſpecially the Small, are ſtraight lines, which are to be drawn by the ſide of a Ruler, yet are few of the Arches of the Capital Letters Arches of Circles, and therefore cannot well be deſcribed with Compaſſes, but are made without Geometrical Conſiderations, onely by Judgment and good Command of Hand; becauſe the Inventers contented themſelves to be directed rather by the Humours of the Pen (which oft differs according to the temper of the Quill and ſhape of the Nib, and a Traditional Obſervance, which cannot be equal in all Hands or Wits) than thoſe nice Symmetrical Proportions which would have preſerved them in all Ages in the ſame Youth and Beauty they were in at the firſt; whenas now not onely Manuſcripts, but many printed Books differ in the ſhape of their Letters among themſelves.

Therefore it is that theſe Paterns cannot be exactly agreeable with all Engliſh Letters; yet have I elected them which are now moſt in mode, and in my Judgment the beſt. Onely I have in ſome few parts (where I think all Ingenious Contrivers would acknowledge Error) corrected them.

The Fatnings, Returnings of Angles, Diſtances of Joynings, and other niceties, are better ſeen by the Paterns, than learnt by many words of Deſcriptions on them. And therefore I have divided (like the Ro-

man) the Plain they ſtand on into 42 equal Parallel parts for the Depth, and through every ſixth part you may draw a ſmall ſtraight line; and alſo divided the bredth or thickneſs of the Letter into ſo many equal parts called Erects, Parallel to each other, as is requiſite; for each Letter you may alſo draw a ſmall ſtraight line downwards, ſo that the Parallel lines and theſe Erects may cut each other at right Angles, which will divide the Plain into ſo many Squares as each Letter is made on. And by theſe Squares you may obſerve how every Member and part of a Member in a Letter paſſes from the Top to to the Bottom-line, and from the right hand to the left, and by making a Plain with the ſame number of Squares, you may carry on the ſeveral ſtrokes from Square to Square, as you find them in your Paterns.

But as I have given you full Inſtructions for the making the Roman Letters, ſo ſhall I give you ſome few Directions, which may ſerve to inform you in all the Rules that belong to theſe Letters, but eſpecially of the Small, becauſe they conſiſt almoſt wholly of ſtraight lines.

The Stem of the Capitals (as was ſaid before) is 6 parts, the Stem of the Small Letters 4 parts. The Foot-line lies in Parallel 9, the Head-line lies in Parallel 33. The Return Angles of thoſe ſtraight lines that proceed from the Head-line and from the Foot-line are 4 parts, *viz.* one Stem below the Head-line, and 4 parts above the Foot-line.

The Fatneſs of the Stem is made by occult Arches placing one Foot of your Compaſſes on the Return Angles, as in A at 1 and 2, and with the other Foot deſcribing the Arches 3 and 4; ſo that a ſtraight

a ſtraight line drawn through the Convex points of theſe two Arches ſhall give the Fatneſs of the Return Angle. The like in all other Letters, as you have been taught in Roman Letters.

The Beaks of the Small Letters, as 𝔟, 𝔥, 𝔨, 𝔩, 𝔣, are 1 part broad and long, and end in a point. The upper ſtroke of theſe Beaks proceed from the Head-line.

The Cloven Tops of 𝔟, 𝔥, 𝔨, 𝔩, project on the left hand 1 part over the Stem, and the point where it divides in the Stem lies in $1\frac{1}{2}$ below the Top-line, at $1\frac{1}{2}$ diſtance from the right hand ſide of the Stem, as you may ſee in the Paterns.

The ſtrokes of 𝔣, 𝔱, 𝔤, lie in the Head-line and 1 part below it, projecting over the Stem 1 part on the left hand, and 2 parts on the right hand.

More Obſervations I think needleſs, becauſe the Letters themſelves are ſo demonſtratively laid down on the Plain. Onely ſome have made all theſe Small Letters with little Beaks on the Angle of every Return, becauſe the Humour of the Pen may be made to give them; but I account them Needleſs, Troubleſom, and Affectatious. Therefore I deliver them plain as they lie in the Squares, whereby they will ſtand more cloſe, become more regular, be quicker made, and more diſtinct and intelligent to the Eye; yet ſuch as affect them ſo may make them at their own diſcretion, by projecting on the Angles 1 part, as you are taught to do the Beaks.

FINIS.

B. P. L. Bin
AUG 30 1910